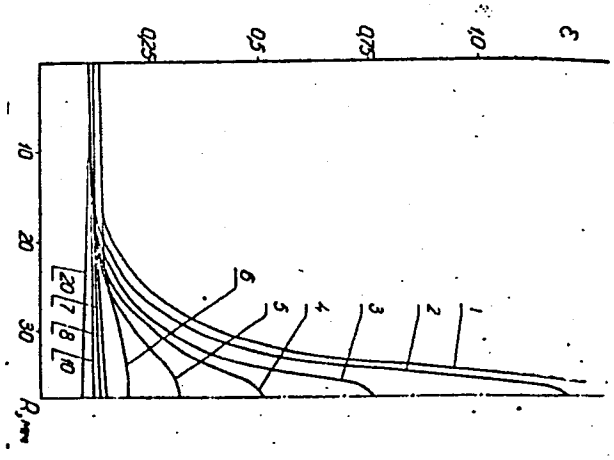
Study of deformation of ....

of the slip-lines field (line 2), which is deflected from the theoretical boundary (line 1) by an angle of $\pi/8$.
There are 10 figures and 2 Soviet references.

Fig. 2:



Card 5/8

S/571/60/000/006/004/011
E193/E383

AUTHORS: Severdenko, V.P., Gavrilov, M.Ye., Makushok, Ye.M. and Segodnik, A.F.

TITLE: Concerning the problem of closed-die stamping on crank presses for hot forging

SOURCE: Akademiya navuk Belaruskay SSR. Fiziko-tekhnicheskiy institut. Sbornik nauchnykh trudov. no. 6. Minsk, 1960, 58 - 65

TEXT: The object of the present investigation was to study elastic deformation of the press/die system during closed-die forging on 1 500 - 2 500 tons crank presses in order to establish the conditions under which both over-filling and finning could be avoided. In spite of the high rigidity of crank presses, they undergo a certain degree of elastic deformation during a forging operation. This is illustrated in Fig. 1, where the elastic strain (ε, mm) in 1 500- and 2 500-ton presses is plotted against the applied load (P, tons), the broken lines representing data supplied by the makers, the continuous lines representing the characteristics of the press/die system determined by the

Card 1/8

Concerning the problem ....

present authors. It was found that under the nominal load the height of the die impression in 1500 - 2 500-ton presses increased by 2.5 and 5.0 mm, respectively. In addition to elastic deformation in the vertical direction, the die deformed elastically in the horizontal direction due to pressure exerted on its walls by compressed metal, the resultant increase in the diameter of the die amounting to 0.5 mm. It is precisely because of this increase in the volume of the die impression that some variation (unavoidable in practice) in the volume of slugs is permissible, which makes closed-die forging a practical proposition. When the actual forging force, P, is lower than the nominal rating of the press, P_o, there is a certain reserve of elastic strain equal to $\varepsilon_o - \varepsilon$ (see Fig.1), which permits accommodating a certain excessive volume of the slug. If the radial strain is also taken into account, the increase in the volume of the die impression, ΔV, can be calculated from:

Card 2/8

Concerning the problem ....

$$\Delta V = \varepsilon_o \left(1 - \frac{P}{P_o}\right) \frac{\pi D^2}{4} + \pi D \sqrt{hH}\,(\Delta D) \qquad (3),$$

where ε_o is the elastic strain of the press under a load,
P_o is equal to the nominal rating of the press,
D and H denote the maximum diameter and thickness of the forging,
d and h are the diameter and the height of the slug and
ΔD is the elastic strain of the die diameter.

In practice, ΔV can amount to more than 5% of the nominal volume of the die impression. At the same time, the volume of slugs can also vary due to unavoidable variation in their length and diameter. This variation, Δv, can be calculated from:

$$\Delta v = \frac{\pi d^2}{4}(\Delta h) + \pi dh(\Delta d) \qquad (4),$$

Card 3/8

Concerning the problem ....

where Δh and Δd are the specified dimensional tolerances of the length (h) and diameter (d) of the slug. If the condition $\Delta V \geq \Delta v$ is fulfilled, closed-die forging can be performed without the provision of a compensating hollow in the die. In this connection, a rapid method of gauging the slug length is required and Fig. 2 shows schematically a closed-die with a device suitable for this purpose. As one forging is being produced, a conical indenter, set at a predetermined position, approaches the flat end of a conveniently-placed slug.

At the end of the stroke the indenter enters the metal and, since the dimension of the resultant impression is ten times greater than its depth, excessively long slugs can be easily identified by visual examination. If ΔV is smaller than Δv, a compensating hollow has to be provided in the die. Its volume is given by:

$$V_{Komp} \geq \Delta v - \Delta V \qquad (5).$$

S/571/60/000/006/004/011
E193/E383

Concerning the problem ....

Associated with over-filling is the problem of finning. Limitations imposed by the design of the die assembly and stroke of the ejector make it impossible to solve this problem by increasing the length of the lock. The tendency to finning, however, can be reduced or even eliminated by improved lock design, such as is shown in Fig. 3, in which the locking part of the top die and the corresponding part of the bottom die are both cylindrical. This design feature, permissible owing to the presence of an ejector, results in a constant lock clearance and prevents compression of the fin (when it is formed), which is unavoidable when a conical lock is employed. The approximate length, ℓ, of the cylindrical portion of the lock which will secure timely closure of the die in forging of gear blanks with a relatively low rim and hub can be found from:

$$\ell_T > \ell > \frac{4V}{\pi D^2} - H_o \qquad (7)$$

Card 5/8

Concerning the problem ....

where ℓ_T is the ejector stroke,

V the volume of the forging,
D its maximum diameter and
H_o its thickness at the circumference.

The optimum lock clearance, δ , is between 0.1 and 0.2 mm. To avoid the risk of misalignment, the edge of the cylindrical portion of the top die is bevelled at 20^o and the edge of the bottom die is given a radius of 1 mm. A gap $\delta_1 = 3 - 5$mm is provided between the horizontal faces of the top and bottom dies to allow for an extra compression when the die is slightly under-filled or to accommodate crushers used to control the forging force in presses not equipped with a dynamometer. There are 4 figures.

Card 6/8

S/571/60/000/006/005/011
E193/E383

AUTHORS: Severdenko, V.P. and Zhilkin, V.Z.

TITLE: Determination of the friction coefficient during drawing of titanium (wire)

SOURCE: Akademiya navuk Belaruskay SSR. Fiziko-tekhnicheskiy institut. Sbornik nauchnykh trudov. no. 6. Minsk, 1960. 66 - 73

TEXT: A method due to Saks and Linkus (Ref. 1 - Spanlose Formung der Metall, K.W.I., 1931) was used in the investigation described in the present paper. The method is based on measuring the force required to pull a wire through a stationary die and through a rotating die. In the latter case, the elements of the metal deformed move along a spiral path, which is inclined at a certain angle, β, to the die axis. The friction force, T, assumed to be constant, also acts at this angle. The horizontal component T_x of T is given by:

$$T_x = T \cos \beta \qquad (1)$$

Card 1/6

Determination of ....

and the angle B is found from:

$$\cos \beta = \frac{v_x}{\sqrt{v_x^2 + v_y^2}} \qquad (2),$$

where v_x is the drawing speed (m/min) and

v_y the linear speed (m/min) of rotation of the die measured on its internal diameter.

The total drawing force can be regarded as a sum of a force P_T required to overcome the friction force, and a force P_A required to overcome the resistance of metal to deformation. According to Saks and Linkus:

Card 2/6

$$P_{\Delta} = P_x - \frac{P_x - P'_x}{1 - \cos \beta} \qquad (4)$$

where P_x and P'_x are forces required to draw the wire through a stationary and rotating die, respectively. Hence, the friction coefficient, f, is given by:

$$f = \frac{P_x - P_{\Delta}}{P_{\Delta}} \operatorname{tg} \alpha \qquad (5),$$

where α is the die cone half-angle (in degrees). The equipment used for measuring f of titanium is illustrated schematically in Fig. 2, which shows: 1 - coiling drum; 2 - dynamometer and a guide roll; 3 - die-rotating mechanism; 4 - intermediate transmission system; 5 - die-revolutions counter; 6 - electric motor (a detailed description of the apparatus is also given). An oscillograph was used to record

Determination of ....

the drawing force, drawing speed and speed of rotation of the die. The measurements were carried out on annealed and work-hardened titanium wire, 1.58 and 1.78 mm in diameter, drawn to the final diameter of 1.5 mm under conditions such that the angle β was $70^{\circ}30'$, $71^{\circ}06'$ or $71^{\circ}42'$. The results are tabulated and reproduced graphically. In Fig. 5, the friction coefficient is plotted against the reduction (Q_{ed}, %) per pass, for annealed material (Curve 1) and for wire reduced by 30 and 60% (Curves 2 and 3, respectively). In Fig. 6, the friction coefficient is plotted against the degree of preliminary deformation (Q_{cym}, %), Curves 1-3 relating to specimens drawn with 10, 19 and 29% reduction per pass. The results obtained show that friction in drawing titanium ($f = 0.06 - 0.11$) is higher than that in drawing steel, for which $f = 0.03 - 0.06$. This difference is attributed to the tendency of titanium to galling and to the presence of a surface oxide film on titanium wire. The fact that f decreased with increasing reduction per pass is not in contradiction to modern views on the nature of contact

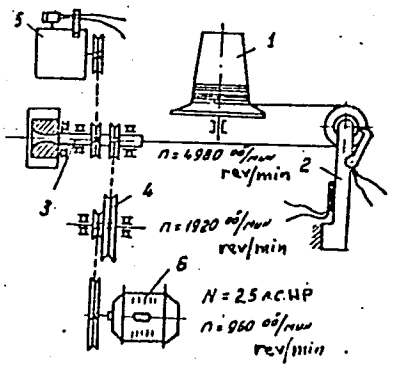
Card 4/6

Determination of ....

friction during wire-drawing. The results showed also that as the reduction per pass decreased, the magnitude of P_T increased and could reach 60 - 70% of the total drawing force. For drafts of 20 - 30%, P_T constitutes 30 - 40% of the total drawing force.

There are 6 figures, 1 table and 1 non-Soviet-bloc reference.

Fig. 2:



Card 5/6

PHASE I BOOK EXPLOITATION SOV/6031

Severdenko, Vasiliy Petrovich, and Stanislav Aleksandrovich Pasechnyy

Metall dlya listovoy shtampovki (Metal for Sheet Forming) Minsk, Izd-vo AN BSSR, 1961. 272 p. Errata slip inserted. 3250 copies printed.

Ed. of Publishing House: L. Mariks; Tech. Ed.: L. Turtsevich.

PURPOSE: This book is intended for scientific research workers and engineering personnel at plants of the metallurgical and machine-building industries. It may also be used by students at schools of higher technical education.

COVERAGE: Problems connected with steelmaking and with the rolling and finishing of sheet metal used for forming in the automotive and machine-building industries are reviewed. Also discussed are defects occurring during sheet forming, methods of preventing these defects, and physical phenomena related to changes in the properties of metal in the process of aging. The authors thank V. S. Ivanova, B. S. Natapov, A. I. Vitkin, V. K. Barziya, and Ya. M. Golovchiner. There are 188 references, Soviet and non-Soviet.

Card 1/6

KONOVALOV, Yevmeniy Grigor'yevich; SEVERDENKO, V.P., akademik, retsenzent; GOREV, K.V., akademik, red.; KHOLYAVSKIY, S., red. izd-va; VOLOKHANOVICH, I., tekhn. red.

[Fundamentals of new methods for machining metals] Osnovy novykh sposobov metalloobrabotki. Minsk, Izd-vo Akad. nauk BSSR, 1961. 296 p. (MIRA 15:3)

1. Akademiya nauk Belorusskoy SSR (for Gorev, Severdenko).
(Metalwork)

SEVERDENKO, V.P.; ANKUT, P.P.

Recrystallization of 40Kh steel during hot deformation. Izv. vys. ucheb. zav.; chern. met. no.3:148-153 '61. (MIRA 14:3)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Steel--Metallography)
(Forging)

SEVERDENKO, V.P.; KALACHEV, M.I.

Measuring normal strains during plastic deformation. Sbor. nauch. trud. Fiz.-tekh.inst. AN BSSR no.7:3-8 '61. (MIRA 15:7)
(Deformations (Mechanics)) (Strain gauges)

S/571/61/000/007/002/010
I048/I248

AUTHORS: Severdenko,V.P., and Kalachev,M.I.

TITLE: The stress-strain diagrams of lead, tin, and aluminum under different stress conditions.

SOURCE: Akademiya nauk Belaruskay SSR. Fiziko-tekhnicheskiy institut. Sbornik nauchnykh trudov. no.7. 1961. 13-24

TEXT: The stress-strain diagrams of pure Pb, Sn, and Al were prepared for tensile, compressive, and torsional stresses, using cast, annealed cylindrical specimens. The surfaces were lubricated to reduce external friction. The stress rates ranged from 6×10^{-3} to 3.0 $min.^{-1}$. An increase in radial stresses accompanied by a decrease in axial stress occurred on removal of the load; as shown on the oscillograms for variations of stress at constant strain. The three-axial compression stress-strain curve of Al closely followed the linear compression curve; the deviation was less than 3-4%. Calculations of process parameters for three-axial compression should be based on data from linear compression tests. In

Card 1/2

SEVERDENKO, V.P.; YELIN, V.I.

Kinetics of the deformation of armco iron. Sbor. nauch. trud. Fiz.-tekh.inst. AN BSSR no.7:30-37 '61. (MIRA 15:7)
(Iron--Metallography) (Deformations (Mechanics))

SEVERDENKO, V.P.; ANKUT, P.P.

Recrystallization of structural steel during hot deformation.
Sbor. nauch. trud. Fiz.-tekh.inst. AN BSSR no.7:38-49 '61.
(MIRA 15:7)
(Steel, Structural--Metallography) (Crystallization)

SEVERDENKO, V.P.; ANKUT, P.P.

Collective recrystallization of structural steel. Sbor. nauch. trud. Fiz.-tekh.inst. AN BSSR no.7:50-55 '61. (MIRA 15:7)
(Steel, Structural--Metallography) (Crystallization)

SEVERDENKO, V.P.; MIRAS, V.S.

Extrusion of heat-resistant alloys with electrolytic heating. Sbor. nauch. trud. Fiz.-tekh.inst. AN BSSR no.7:56-59 '61. (MIRA 15:7)
(Heat-resistant alloys) (Extrusion (Metals))

S/571/61/000/007/003/010
I048/I248

AUTHORS: Severdenko,V.P., and Muras,V.S.

TITLE: Plasticity and resistance to deformation of refractory alloys during pressure-working on high-speed presses with electrolytic heating

SOURCE: Akademiya nauk Belaruskay SSR. Fiziko-tekhnicheskiy institut. Sbornik nauchnykh trudov. no.7. 1961. 60-64

TEXT: The effect of electrolytic heating on the resistance to deformation and plasticity of three refractory alloys designated A (Fe-based, strained structure), B (single-phase Fe-based, fine-grain structure), and C (Ni-based, uniform structure) was studied using a high-speed press, with concentrated K_2CO_3 electrolyte as the heating medium. The temperature ranges were 1100-1308°C, 1100-1210°C, and 1070-1300°C for alloys A, B, and C respectively, and in all cases specimens deformed to a 16.5% strain showed no cracks. Disintegration took place at higher temperatures, due to partial melting along the grain boundaries. The resistance to de-

Card 1/2

S/571/61/000/007/003/010
I048/I248

Plasticity and resistance to...

formation (p) of alloy A was an exponential function of the temperature (t):

$$p=7.1\ e^{0.0057(1308^{0}-t)}\ ;$$

no such p - t relationship was observed in alloys B and C, due to recrystallization of these alloys. Although alloy A recrystallizes at these temperatures, the exponential relationship held during the short time of working. The plasticity of A at 1280°C decreased with increasing speed of the press, from 67% at 120 runs-per-minute to 52% at 250 runs-per-minute. The plasticity indexes obtained were always higher than those obtained in tests using furnace heating; due to the shorter thermo-mechanical cycle. The plasticity always decreased with increasing temperature, and the upper limit of plasticity was essentially the same as that obtained in the resistance-to-deformation tests; the breakdown ascribed to melting along the grain boundaris. There are 5 figures.

Card 2/2

1.1200

31315
S/124/61/000/010/055/056
D251/D301

AUTHORS: Severdenko, V.P. and Klubovich, V.V

TITLE: The deformation of metal in an ultrasonic field

PERIODICAL: Referativnyy zhurnal. Mekhanika, no. 10, 1961, 63, abstract 10 V528 (Dokl. AN BSSR, 1961, 5, no. 1, 15-16)

TEXT: The effect is investigated of ultrasonic vibration on a deposit of an aluminum sample under compression. The mean force for deformation of the sample in the ultrasonic field is 2-3 times less than without ultrasonics, and the dimensions of the "barrel" are 30-40% less. With the increase of ultrasonic intensity, the samples are deformed without the formation of "barrels". The ultrasonics decrease the force of contact friction and the force of plastic deformation of the metal. [Abstracter's note: Complete translation]

Card 1/1

SEVERDENKO, V.P.; MEKHED, I.N.

Studying the thermal pattern of the performance of dies in hot stamping. Dokl.AN BSSR 5 no.5:212-214 My '61. (MIRA 14:5)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Dies (Metalworking))

S/137/62/000/001/146/237
A006/A101

AUTHORS: Severdenko, V.P., Brekhov, K.V.

TITLE: Mechanical properties of 9 ХС (9KhS) steel at high temperatures

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 1, 1962, 39, abstract 1I265 ("Dokl. AN BSSR", 1961, v. 5, no. 8, 339 - 340)

TEXT: An investigation was made of 9KhS steel containing in %: C 0.86; Cr 1.2; Si 1.3; Mn 0.42; Ni 0.15; S 0.023; P 0.039. The steel possesses a sufficient ductility reserve at 950 - 1,100°C. 9KhS steel should not be pressure-worked at 950°C, since a drop of ductility was observed at these temperatures. Considering the high Si content, causing intensified scale formation, the steel should be preheated in deoxidizing atmosphere prior to being worked.

T. Rumyantseva

[Abstracter's note: Complete translation]

Card 1/1

SEVERDENKO, V.P.; PASECHNYY, S.A.; TOCHITSKIY, E.I.

Device for the deformation of films in an electron microscope.
Dokl. AN BSSR 5 no.9:387-388 S '61. (MIRA 14:10)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Electron microscope)

SEVERDENKO, V.P.; PASECHNYY, S.A.; TOCHITSKIY, E.I.

Electron microscope study of aluminum films. Dokl. AN BSSR 5 no.10:452-454 O '61. (MIRA 15:3)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Aluminum--Metallography)

SEVERIN, V.I.; MAKSIMENKO, P.A.

Lowering the cost of building refractory plants. Ogneupory 26 no.7:342-343 '61. (MIRA 14:7)

1. Vostochnyy institut ogneuporov (for Severin). 2. Gosplan SSSR (for Maksimenko).
(Refractories industry)

10,7300

S/250/62/006/002/005/007
I028/I228

AUTHOR: Severdenko, V. P. and Kal'nitskiy, R. M.

TITLE: On the problem of determination of a plasticity criterion

PERIODICAL: Akademiya nauk Belaruskay SSR. Doklady, v. 6, no. 2, 1962, 97-99

TEXT: There being no generally accepted plasticity indicator at the present time, the authors define a criterion of plasticity e_{pe}, that characterizes the capacity of irreversible deformation without destruction of metals and, or alloys. In a deformed body, part of the macrovolumes are subjected to extension stresses, others — to compression stresses. The destruction occurring earlier in the former, the criterion is defined for the case of extension. A transition leads to a linear scheme for the stressed state, and the following expression is obtained for the plasticity criterion:

$$e_{pe} = e_e + \frac{\sigma_e^l - \sigma_{oe}}{\sigma_n} \qquad (2)$$

where e_{pe} = criterion of plasticity, corresponding to the value of the actual deformation which would be obtained in a monoaxial extension, e_e = limiting actual deformation on extension, σ_{oe} = actual rupture stress reduced to the linear scheme, σ_n = actual stress at the beginning of concentrated stress, σ_e^l = actual rupture stress at monoaxial extension. Formulas are then established, on the basis of equations of the mecha-

Card 1/2

nics of continuous media, for a transition from volume to linear extension. In the case of α-iron, these formulas reduce to.

$$\sigma_e^l = \sigma_{1e}/\sqrt{n}, \quad \sigma_{oe} = \sigma_{1e}/n$$

where σ_{1e} = principal maximum stress at the moment of rupture, n = coefficient of stressed state.

INSTITUTION: Fiziko-tekhnicheskii institut AN BSSR (Institute of Physics and Technology of AS BSSR)

SUBMITTED December 22, 1961

SEVERDENKO, V.P.; KALEDIN, B.A.

Plastic deformation in transverse rolling in a three-roller mill. Dokl. AN BSSR 6 no.5:305-307 My '62. (MIRA 15:6)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Deformations (Mechanics))
(Rolling (Metalwork))

10.7500

S/250/62/006/009/003/004
1046/1246

AUTHORS: Severdenko, V. P. and Klubovich, V. V.

TITLE: Investigation of the mechanical properties of aluminum in the ultrasonic field

PERIODICAL: Akademiya nauk BSSR. Doklady, v. 6, no. 9, 1962, 553–566

TEXT: Experiments with aluminum rods 10 mm in diameter and 110 mm long (effective length being equal to half the vibration wavelength) show that the specimens lose in strength, plasticity, and microhardness when subjected to tensile deformation in an ultrasonic field. Failure of aluminum specimens under ultrasonic vibrations is similar to failure observed in fatigue tests. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiyinstitut AN BSSR (Physico-technical Institute, AS BSSR)

SUBMITTED: July 2, 1962

Card 1/1

S/250/63/007/001/004/005
A006/A101

AUTHORS: Severdenko, V. P., Lozhechnikov, Ye. B.

TITLE: Distribution of specific pressure over the grip arc in rolling iron powder strips

PERIODICAL: Doklady Akademii nauk BSSR, v. 7, no. 1, 1963, 27 - 29

TEXT: If the distribution of specific pressure on the rolls over the grip arc is known, the resultant of metal pressure on the rolls and its location can be determined. These factors are required to calculate the working stand, the transmission and power of a rolling mill drive. Iron powder strips were rolled on a special rolling mill with 180 mm diameter rolls. The roll barrel was 180 mm long. The motor power was 13 kw. The rolling speed was 0.055 m/sec. A special roll with an incorporated dynamometer was used to determine directly the distribution of specific pressure. The БМ(BM) powder employed was additionally reduced at 800°C, in dissociated ammonia atmosphere. The powder was rolled to 0.8 - 1.47 thick, 90 mm wide strips of 6.3 to 4.5 g/cm^3 density. The pressure of the powder on the rolls was non-uniform. Initially pressure increased smoothly

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Distribution of specific pressure over... S/250/63/007/001/004/005
A006/A101

from zero to a given value, and rpse then to a maximum. The drop of pressure from the maximum to zero was even more abrupt over an arc corresponding to angles $1^{\circ}20' - 2^{\circ}30'$. Comparison tests show that in rolling iron powder to 0.8 - 1.47 mm thick strips, the maximum specific pressure over the grip arc is 20 - 25% below that of strips pressed to analogous density. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physical Engineering Institute of AS BSSR)

SUBMITTED: October 16, 1962

Card 2/2

SEVERDENKO, V.P.; KLUBOVICH, V.V.

Drawing of copper wire in an ultrasonic field. Dokl. AN BSSR 7 no.2:95-98 F '63. (MIRA 16:7)

1. Fiziko-tekhnicheskiy institut AN BSSR.
(Ultrasonic waves--Industrial applications)
(Wire drawing)

L 16612-63 EWP(k)/EWP(q)/EWT(m)/BDS AFFTC/ASD Pf-4 JD/HW

S/250/63/007/004/005/005

62
61

AUTHOR: Severdenko, V. and Lozhechnikov, Ye.

TITLE: Forward slip in rolling powdered-metal strip

PERIODICAL: Akademiya Nauk BSSR. Doklady. v. 7, no. 4, 1963, 244-246

14

TEXT: Forward slip in the rolling of powdered-metal strip was investigated on a special rolling mill with rolls with diameter of 120, 150, and 180 mm, of 40KhN steel. The powders, of PZh4MZ iron and PM-2 copper, were rolled into strips 90 mm wide. Investigations revealed that in such cases forward slip depends on the density of the strip, increasing as it increases. Similarly, as the roll diameter increases, forward slip increases. In cases where powdered-metal strip is rolled with one roll working and the other idle, forward slip differs for the working and idle rolls. The authors experiments revealed that forward slip for the working roll, when rolling an iron-powder strip increases from 0.43% for strip density of 5.5--6.5 g/cm^3 to 1% for strip density of 7--7.2 g/cm^3, for the working roll. The corresponding figures for the idle roll are from 1.5 to 5.7%, respectively. When rolling copper-powder strip, however, the forward slip for the working roll changed from 0.01 to 0.02%, and for the idle roll, from 0.75 to 1.57%.

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Card 1/2

L 16612-63

S/250/63/007/004/005/005

Forward slip in rolling...

The higher forward slip in the idle roll is due to the fact that the rolled metal rotates the roll by friction forces. There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Engineering-Physics Institute, Academy of Sciences, Belorusskaya SSR)

SUBMITTED: February 27, 1963

Card 2/2

L 17112-63 EWP(k)/EWP(q)/EWT(m)/BDS AFFTC Pf-4 JD/HW

ACCESSION NR: AP3003042 S/0250/63/007/005/0320/0323

63
62

AUTHORS: Severdenko, V. P.; Kaledin, B. A.

TITLE: Stressed state under transverse forging 14

SOURCE: AN BSSR. Doklady, v. 7, no. 5, 1963, 320-323

TOPIC TAGS: plasticity, elasticity, experimental elasticity, stressed state

ABSTRACT: The authors studied deformations in lead and aluminum 27 when two 3 mm-pins of the same material, respectively, are fixed into holes perpendicular to each other. They conclude that the stressed state of the central zone of the specimen under transverse forging and rolling is characterized by the presence of compressing stresses acting in the direction of the exterior forces. The size of these stresses per unit strain up to 8% is comparatively small and, therefore, the corresponding hydrostatic pressure in the axial zone is negative (which lowers somewhat the margin of plasticity in this zone). The difference between the maximal (transverse stretching) and the minimal (compressing) stresses corresponds to the plastic condition. Therefore, the collapse of the axial zone will precede plastic deformation. Orig. art. has: 1 formula and 2 figures.

16

Card 1/3

L 17112-63

ACCESSION NR: AP3003042

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physical Technical Institute, Academy of Sciences, Byelorussian SSR)

SUBMITTED: 26Mar63 DATE ACQ: 22Jul63 ENCL: 01

SUB CODE: AP NO REF SOV: 004 OTHER: 000

Card 2/3

SEVERDENKO, V.P.; BREKHOV, K.V.

Extrusion of high-speed steel. Dokl. AN BSSR 7 no.10:681-683 O '63. (MIRA 16:11)

1. Fiziko-tekhnicheskiy institut AN BSSR.

SEVERDENKO, V.P.; LOZHECHNIKOV, Ye.B.

Energy in the rolling of a powder metal strip. Dokl. AN SSSR 7 no.11:775-778 N '63. (MIRA 17:9)

1. Fiziko-tekhnicheskiy institut AN BSSR i Belorusskiy politekhnicheskiy institut.

SEVERDENKO, V.P.; LEUS, I.S.

Distribution of maximum specific pressure along the width of a strip during the cold rolling of brass. Izv. vys. ucheb. zav., tsvet. met. 7 no.5:123-128 '64 (MIRA 18:1)

1. Kafedra mashin i tekhnologii obrabotki metallov davleniyem Belorusskogo politekhnicheskogo instituta.

ACCESSION NR: AP4040501 S/0136/64/000/006/0075/0076

AUTHORS: Severdenko, V. P.; Kalachev, M. I.; Ankut, P. A.

TITLE: The effect of temperature and deformation rate in the elongation of technically pure titanium

SOURCE: Tsvetnyye metally, no. 6, 1964, 75-76

TOPIC TAGS: titanium, temperature effect, elongation, elasticity, titanium VT1 1, electron potentiometer EPD 12, metal failure

ABSTRACT: The variation in titanium VT1-1 mechanical properties during its deformation was studied in the temperature range of 20-800C, with the deformation rate varying from 4×10^{-3} to 2.0 min^{-1}. The temperature was measured by a platinum-platinorhodium thermocouple and a D. C. potentiometer. An electron potentiometer EPD-12 was used for a temperature-regulating device. The variation in temperature resulted not only in an increase of decrease of metal resistance to flow but also in certain changes in the alignment of the indicator curves as shown on the metal deformation diagram (see Fig. 1 on the Enclosure). The "limit of physical flow," appearing as a small flat zone in the temperature range of 100-400C, disappeared at 600C. In the latter case, the rate of 4×10^{-3} min^{-1} caused a

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ACCESSION NR: AP4040501

complete metal recrystallization, which proceeded more rapidly than the hardening process. The shape of the indicator curve was similar to that for hot deformation, and the plasticity of the metal was practically unlimited. The increase in the deformation rate at constant temperature raised the resistance to deformation and lowered the metal plasticity. This phenomena was explained by the fact that under these conditions metal recrystallization could not be completed during the deformation period; at constant temperature its velocity remained constant while that of the metal flow was increased tenfold. Further increase in the deformation rate to 2.0 min^{-1} did not affect the shape of the curve; there was a tendency to lower the metal strength, but otherwise the nature of the deformation development and of metal failure remained the same as at the rate of 4×10^{-3} min^{-1}. At 800C the deformation proceeded without metal hardening, regardless of the rate. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 06Jul64 ENCL: 01

SUB CODE: MM NO REF SOV: 001 OTHER: 000

Card 2/3

ACCESSION NR: AP4040501

ENCLOSURE: 01

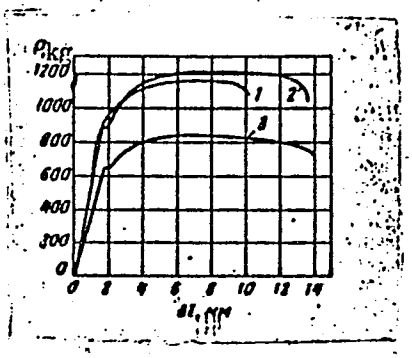

Fig. 1. Influence of the temperature on the nature of indicator diagram: 1- room temperature; 2- 100C; 3- 200C.

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L 16420-65 EWP(e)/EWT(m)/EWP(w)/EWA(d)/EPR/EWP(t)/EWP(k)/EWP(b) Pf-4/
Ps-4 IJP(c)/SSD(a)/BSD MJW/JD/HW

ACCESSION NR: AP4049078 S/0136/64/000/011/0088/0090

AUTHOR: Severdenko, V. P.; Lozhechnikov, Ye. B.; Shelamov, V. A.

TITLE: Rolling SAP foil directly from powder

SOURCE: Tsvetny*ye metally*, no. 11, 1964, 88-90

TOPIC TAGS: aluminum powder, APS-1 aluminum powder, SAP strip, SAP foil, SAP strip rolling, SAP foil rolling, optimum rolling technology

ABSTRACT: Two variants of making SAP strip and foil directly from aluminum powder have been tried. In the first variant, green strip was rolled with the powder and rolls at room temperature. The highest density of green strip (2.35 g/cm^3) with no breaks or cracks was achieved by rolling at a speed of 0.055 m/sec and a gap between rolls (the strip thickness) of 2.3 mm. In the second variant, the powder was preheated to 450—500C, and the rolls and bunker were kept at 100C. High-quality strip with a density of 2.4 g/cm^3 was produced at a rolling speed of 0.023 m/sec. Hot-rolled and cold-rolled strips were rolled into foil, up to 150 μ thick, with a 10% max reduction per pass and with process annealing at 450C after each pass. The foil

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had a density of 2.8—2.9 g/cm^2 and a tensile strength of 5 kg/mm^2 at 500C. Annealing of the strip at 600C for 3 hr before final rolling decreased the tensile strength of the foil to 4 kg/mm^2, but eliminated blistering and flaking which otherwise would occur in high-temperature annealing. Annealing at 600C for 3 hr caused recrystallization in the foil and a further decrease in tensile strength to 3 kg/mm^2. The technology recommended for rolling APS-1 aluminum powder into SAP foil up to 150 μ thick consists of cold or hot rolling of powder into strips about 2.5 mm thick, annealing at 620C for 3 hr, and final hot rolling with a 10% max reduction per pass, with process annealing after each pass. Foil up to 100 mm wide and several meters long was made by the same technology. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 007 OTHER: 001 ATD PRESS: 3147

Card 2/2

L 33948-65 EWT(d)/EPA(s)-2/EWP(k)/EWP(h)/EWP(b)/EWP(l)/EWP(t)/EWP(v)/EWA(d)/T/EWT(m)/EWP(e)/EPF(c)/EPF(n)-2/EPR/EPA(w)-2 Pf-4/Pr-4/Ps-4/Pt-10/Pu-4/Pab-10 IJP(c)

ACCESSION NR: AP4049065 WH/MJW/JD/WW/JG S/0148/64/000/011/0120/0123

AUTHOR: Severdenko, V. P.; Lozhechnikov, Ye. B.

TITLE: Rolling pressure during powder rolling of bands

SOURCE: IVUZ. Chernaya metallurgiya, no. 11, 1964, 120-123

TOPIC TAGS: powder rolling, cermet, rolling pressure, powder metallurgy, iron powder

ABSTRACT: Experiments were carried out on a special rolling mill equipped with a tensiometer to determine the total and specific rolling pressures. The specific pressure along the arc of the angle of contact was determined during rolling with 180-mm diam. rolls with a built-in dynamometer. The pressure of the rolled metal was absorbed by a 1.81-mm diam. pin protruding onto the surface of one of the roll barrels and was transmitted to a compression dynamometer. The total rolling pressure was determined by two compression dynamometers installed between the adjusting screws and the chocks. BM-brand iron powder was used. Rolling was in a vertical direction. The specific pressure along the contact arc was determined at rolling speeds of 0.3 and 0.055 m/sec. The results of measuring the maximal specific rolling pressures and specific pressing pressures of compacts relative to the

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ACCESSION NR: AP4049065

density of the bands and compacts demonstrated that the maximal rolling pressure is appreciably less than the specific pressing pressure. At low densities of cermet articles (4.5-5 g/cm^3), the maximal specific rolling pressure was 73-75% of the pressing pressure, and with an increase in density to 6-6.2 g/cm^3 it was about 70%. The smaller values of the maximal specific rolling pressure as compared with pressing are due to the more favorable conditions of powder compaction in rolls since the particles can shift laterally and in the direction opposite to rolling. Higher pressing pressures also arise owing to friction on the mold walls. Total rolling pressure was determined with rolls 85, 120, 150, and 180 mm in diam. at speeds of 3.1 and 24 rpm. The rolling speed varied from 1.17 to 13.55 m/min. It was found that a change of rolling speed in this range did not affect the rolling pressure. It was also found that the density of the cermet band had a significant effect on the rolling pressure, which increased markedly with density of the band. The total rolling pressure also increased as the roll diameter increased. Orig. art. has: 1 table and 3 figures.

ASSOCIATION: Belorusskiy politekhnicheskiy institut (Belorussian polytechnic institute)

SUBMITTED: 29Apr63 ENCL: 00 SUB CODE: MM, IE

Card 2/2 NO REF SOV: 007 OTHER: 000

ACCESSION NR: AP4033647 S/0250/64/008/003/0154/0156

AUTHORS: Severdenko, V. P.; Gurskiy, L. I.

TITLE: A study of the physical state of a surface layer with plastic deformation

SOURCE: AN BSSR. Doklady*, v. 8, no. 3, 1964, 154-156

TOPIC TAGS: fractional rolling, plastic deformation, electrolytic polishing, electron diffraction camera EM 4, crystal, Armco iron, M 1 copper

ABSTRACT: The surface layer on Armco iron and M-1 copper under fractional rolling was studied. The stock (50 mm long, 25 mm wide, and 1-10 mm thick) was rolled with 400 mm diameter cylindrical rollers. The total deformation was 50, 70, and 80%. Previous work showed that the greatest irregularity in the plastic deformation of the surface occurred with reductions of 1-2% per pass; this study was limited to reductions of 1-1.5% per pass. With small reductions the crystals in the surface are crushed and the crystal lattice distorted. Previous experiments showed that with plastic deformation in cold rolling the crystal structure was crushed to such an extent that the Debye powder pattern showed only one faint line. The plastic deformation occurred in a thin surface layer, where it accumulated with each pass. An EM-4 electron diffraction camera was used to study

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ACCESSION NR: AP4033647

the samples. These were electrolytically polished (copper by orthophosphoric acid of 1.3 sp. gr., current density 0.65-0.75 a/dm^2, voltage 2V, room temperature, copper anode; iron by 510 ml orthophosphoric acid of 1.7 sp. gr., 32 ml water, 100 g chromium anhydride, current density 40-50 a/dm^2, voltage 15-20V, temperature 70-90, iron anode). They were next cleaned by reducing the voltage, and were washed in methylene alcohol and acetone, then dried in nitrogen. The uppermost surface area in direct contact with the roller would not give a diffraction picture. Removing ~ 50 Å layer produced an electron diffraction pattern with one aureole. Further electrolytic polishing produced 3-4 faint diffuse aureoles. Further layer removal of ~ 1 micron gave a diffraction picture characteristic of a strongly textured metal. It was concluded that in plastic deformation there exists a limit to the practical expansion of a roentgen line. Strong deformation from overall compression can reduce grains to 10^{-7} cm. The crystal size L is given by $L = \frac{0,9R\lambda}{b\cos\theta}$, where b is the line width, R is the sample-film distance, λ is the wave length, and θ is the Wulff-Bragg angle. The crystal sizes in the thin surface layer were computed to be 10^{-7} cm or smaller. No crystal structure

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ACCESSION NR: AP4033647

was found in the outermost surface layer. Orig. art. has: 2 photographs.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physicotechnical Institute AN BSSR)

SUBMITTED: 14Jan63 ENCL: 00

SUB CODE: MM NO REF SOV: 004 OTHER: 000

Card 3/3

BR

ACCESSION NR: AP4042728 S/0250/64/008/006/G382/0385

AUTHOR: Severdenko, V. P.; Tochitskiy, E. I.; Shelamov, V. A.

TITLE: An investigation of the structure of a deformed SAP material

SOURCE: AN BSSR. Doklady*, v. 8, no. 6, 1964, 382-385

TOPIC TAGS: aluminum, aluminum powder, SAP, aluminum powder sintering, sintered aluminum powder structure, sintered aluminum powder strength

ABSTRACT: The effect of cold working on the structure of SAP has been investigated. Aluminum powder containing 6—11% Al_2O_3 was cold compacted under a pressure of 35 kg/mm^2, sintered at 620C for 6 hr, and hot compacted at 500C under a pressure of 50 kg/mm^2. The billets obtained were cold rolled with reductions up to 99.6—99.7%. The structure of sintered SAP was found to consist of an aluminum matrix and a three-dimensional network formed by aluminum oxide. Cold rolling gradually destroys this network and reduces its strengthening

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ACCESSION NR: AP4042728

effect. Cold rolling with reduction up to 95% does not produce any definite texture which could be detected by microscopic examination, but x-ray diffraction patterns revealed a texture in SAP rolled with 83.3% reduction. Annealing of cold-rolled SAP at 650C for 3 hr leads to recrystallization. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physicotechnical Institute, AN BSSR).

SUBMITTED: 02Apr64 ATD PRESS: 3086 ENCL: 00

SUB CODE: MM NO REF SOV: 004 OTHER: 000

Card 2/2

SHVEDCHENKO, V.P.; GURSKIY, L.I.

Broadening in fractional deformation. Dokl. AN BSSR 8 no.7:444-446 '64. (MIRA 17:10)

1. Fiziko-tekhnicheskiy institut AN BSSR.

SEVERDENKO, V.P.; KALACHEV, M.I.; ANKUT, P.A.

Effect of temperature and rate of deformation on the extension of technically pure titanium. TSvet. met. 37 no.6:75-76 Je '64. (MIRA 17:9)

L 19506-65 EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) SSD/AFWL/ASD(a)-5/ASD(f)-3/AFETR/ESD(c)/ESD(t) EM/JD

ACCESSION NR: AP4048038 S/0020/64/158/006/1318/1319

AUTHOR: Severdenko, V. P. (Academician AN BSSR); Tochitskiy, E. I.; Yelin, V. I.

TITLE: Generation and propagation of cracks 18 B

SOURCE: AN SSSR. Doklady, v. 158, no. 6, 1964, 1318-1319

TOPIC TAGS: crack, generation, propagation, dislocation, dislocation propagation, stress concentration 18 24

ABSTRACT: The generation and propagation of microcracks in iron films 600—800Å thick have been studied with an electron microscope on specimens subjected to deformation in a micro-tensile-test machine. Cracks originated at film edge and propagated in a jump-like manner. Crack edges had a jagged appearance. On the basis of observations the following mechanism of plastic deformation and rupture has been suggested. The stresses applied to specimens generate dislocations which move in slip planes until they are stopped by some obstacle, such as inclusions, grain boundaries, or accumulated dislocations. As the density of dislocations increases, it finally reaches a limit

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L 19506-65
ACCESSION NR: AP4048038

at which the microcrack nuclei begin to form in places of stress concentration. As the stresses increase, these nuclei grow into microcracks which flow together to form a crack. The propagating crack acts like a wedge, forming local regions of very high stresses which again cause an accumulation of dislocations and the formation of microcrack nuclei and microcracks. The jump-like propagation of cracks is explained by a different resistance to propagation of the sections containing microcracks and those with high dislocation density (see Fig. 1 of the Enclosure). The dislocation density in the slip planes, at which the microcrack nuclei begin to form, was estimated as about $5.10^6 \cdot cm^{-2}$. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk BSSR (Physicotechnical Institute, AN BSSR)

SUBMITTED: 02Jul63 ENCL: 01 SUB CODE: MM, AS

NO REF SOV: 001 OTHER: 001 ATD PRESS: 3159

Card 2/3

L 19506-65
ACCESSION NR: AP4048038

ENCLOSURE: 01

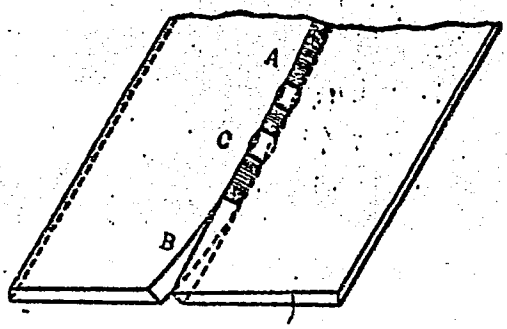

Fig. 1. Propagation of cracks

A - Area with high dislocation density; B - crack; C - area with microcracks.

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L 39985-65 EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/EWA(d)/EWP(e)/EWP(t) Pf-4 IJP(c)
JD/HW/GS

ACCESSION NR: AT5006707 S/0000/64/000/000/0040/0045

AUTHOR: Severdenko, V. P. (Meritorious scientist of science and technology BSSR, Academician AN BSSR, Doctor of technical sciences, Professor); Kalachev, M. I.; Ankut, P. P.

TITLE: Certain characteristics of titanium elongation

SOURCE: AN BSSR. Fiziko-tekhnicheskiy institut. Plastichnost' i obrabotka metallov davleniyem (Plasticity and metalworking by pressure). Minsk, Izd-vo Nauka i tekhnika, 1964, 40-45

TOPIC TAGS: titanium, tensile, testing, deformation rate, titanium deformation, plastic flow, stress strain diagram, titanium oxidation

ABSTRACT: In order to study the effect of temperature and rate of deformation on the plastic flow curves, the authors used technically pure titanium with a low content of impurities. Hot-pressed titanium rods 22 mm in diameter were cut into two equal parts along the axis, with ends trimmed off, and made into standard 36x6-mm specimens. These specimens were annealed at 700C for 2 hrs. and air cooled; annealing was in the region of the alpha-modification. The tests were carried out at 200C intervals from 20 to 800C with an additional test at 100C. To study the effect of the strain rate on the shape of the hardening curve, the

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ACCESSION NR: AT5006707

strain rate was changed 500 times for each test temperature, and the values of the stress rate were selected as $4 \cdot 10^{-3}$, $4 \cdot 10^{-2}$, $4 \cdot 10^{-1}$, and 2.0 min^{-1}. An analysis of the stress-strain diagram showed that the process of linear elongation of titanium varied considerably depending on the temperature and strain rate. Heating to 100C caused the appearance of a "physical" yield point in the form of a small platform on the stress-strain curve, which was most obvious at the lowest strain rate. This was interpreted as the occurrence of transformations in the titanium during plastic flow. The strain rate had the greatest effect on the flow of titanium at 600C. Three types of flow curves were distinguished depending on the strain rate. The smallest number of twinning planes for titanium was in the temperature range of 500-600C. An increase in the strain rate to $4 \cdot 10^{-1}$ and 2.0 min^{-1} did not change the strength and plastic properties of titanium. Intense surface oxidation of the metal with the formation of a yellow film began at 800C. Traces of plastic flow could frequently be seen on the oxide film in the form of a network of slip lines. Orig. art. has: 4 figures.

ASSOCIATION: None

SUBMITTED: 16May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 001

Card 2/2 mb

[illegible], V.I. [Pavlenzema, V.I.]; [illegible], P.A. [Markhusik, P.A.]

Academician Vasilenko Nemyu, 1905- ; on his 60th birthday. Vestsi AN BSSR, Ser. fiz.-tekh. nav. no.4:123-124 '64. (MIRA 18:3)

L 39981-65 EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/EWA(d)/EWP(e)/EWP(t) Pf-4 JD/
HW/GS
ACCESSION NR: AT5006710 S/0000/64/000/000/0110/0124

AUTHOR: Severdenko, V. P. (Meritorious scientist of science and technology BSSR, Academician AN BSSR, Doctor of technical sciences, Prof.); Lozhechnikov, Ye. B.

TITLE: Rolling of strip from metal powders

SOURCE: AN BSSR. Fiziko-tekhnicheskiy institut. Plastichnost' i obrabotka metallov davleniyem (Plasticity and metalworking by pressure). Minsk, Izd-vo Nauka i tekhnika, 1964, 110-124

TOPIC TAGS: powder metallurgy, powder rolling, cermet, rolling speed, forward creep, roll pressure

ABSTRACT: The purpose of this article was to describe the progress which has been made in the fabrication of strip by powder rolling. The authors give an account of the main stages in the rolling of powders: the production and preparation of a powder of the required chemical and granulometric composition, the roll compaction of powders into a raw strip, and its sintering in a vacuum and reducing or neutral atmosphere with subsequent sizing or packing rolling. Powder rolling in vertical, horizontal, and inclined directions is described with particular reference to vertical rolling since it is the most convenient and wide-

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L 39981-65

ACCESSION NR: AT5006710

spread method. The authors describe investigations carried out at the Belorussiy politekhnicheskiy institut (Belorussian Polytechnic Institute) concerning rolling of strip from powder at a rolling speed of 3.1 - 24 rpm on a mill having replaceable rolls with a barrel diameter of 85, 120, 150, and 180 mm, the powder being fed to the rolls from a bunker immediately above them. Citing from several sources, the authors describe the measurement of the specific pressures along the arc of contact and derive formulas for the tilting moment and torque. The process of rolling powders from their entrance into the rolls to the discharge of strip from them is divided into three periods: initial unsteady period, steady period, and final unsteady period. The initial unsteady period proceeds differently depending on the rolling speed and the properties of the powder. The steady period is characterized by a constancy of the thickness and density of the strip over the entire length. The final unsteady period is characterized by a gradual decrease in the thickness and density of the strip owing to the decrease in the quantity of powder in the bunker. The next aspects considered are the rolling rate relative to the thickness and density of the strip; forward creep during rolling as a function of strip density; roll pressure, with the indication that the pressure markedly increases with density; and the energy of

Card 2/3 Submitted 16 May 64

L 39980-65 EWP(k) EWA(h)/EWA(c)/EWT(l)/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) Pf-4/
Pl-4/Peb IJP(c) JD/HW/GS
ACCESSION NR: AT5006711 S/0000/64/000/000/0124/0128

AUTHOR: Severdenko, V. P. (Meritorious scientist of science and technology BSSR, Academician AN BSSR, Doctor of tech. Sciences, Professor); Klubovich V. V.

TITLE: Investigation of the microstructure of copper deformed in an ultrasonic field

SOURCE: AN BSSR. Fiziko-tekhnicheskiy institut. Plastichnost' i obrabotka metallov davleniyem (Plasticity and metalworking by pressure). Minsk, Izd-vo Nauka i tekhnika, 1964, 124-128

TOPIC TAGS: ultrasound, copper microstructure, ultrasonic deformation, work hardening, copper upsetting, copper etching, stress elimination, copper hardness

ABSTRACT: Experiments on the upsetting and elongation of copper in an ultrasonic field were carried out at a force of 2.5 metric tons and a resonance frequency of 22.5 kc. The copper specimens for the upsetting tests were 6 mm in diameter and 9 mm high, and for the tensile tests the testpieces had a working length of 15, 25, 36, and 60 mm and a diameter of 4-6 mm. The testpieces were annealed in a vacuum of 10^{-2} mm Hg; holding time in the vacuum furnace varied from 20 to 90 min. After upsetting, the specimen was cut lengthwise, ground and polished, and

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ACCESSION NR: AT5006711

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etched with a mixture of 25% ammonia and 3% hydrogen peroxide. An investigation of the microstructure of the specimens in the rupture zone after elongation under ordinary conditions and in an ultrasonic field revealed that at the sites of fracture the grains were elongated in static extension. Elongation of the grains was also observed at the rupture site in an ultrasonic field during extension, but the change in structure was less evident than after ordinary extension. This indicated to the authors that, under the influence of ultrasonic vibrations, stress-relieving processes occur along with work-hardening. The stress-relieving effect of ultrasound was confirmed by measuring the microhardness of the metal in the rupture zone under static and vibration loading. After extension in an ultrasonic field the microhardness in the rupture zone was much lower than after static extension. The authors conclude that ultrasonic vibrations produce a change in the microhardness and microstructure of the metal during its upsetting, as well as partially relieving the stress of the metal in the rupture zone. Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 16May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 001 OTHER: 000

Card 2/2 pb

L 39979-65 EPR/EWP(k)/EWA(c)/EWT(m)/EWP(b)/EWA(d)/EWP(t) Pf-4/Ps-4 IJP(c)
JD/HW/GS
ACCESSION NR: AT5006715 S/0000/64/000/000/0249/0256

AUTHOR: Severdenko, V. P. (Meritorious scientist of science and technology BSSR, Academician AN BSSR, Doctor of tech. sciences, Prof.); Tochitskiy, E.I.; Chaplanov, A.M.

TITLE: Epitaxial growth of metallic films on halides

SOURCE: AN BSSR. Fiziko-tekhnicheskiy institut. Plastichnost' i obrabotka metallov davleniyem (Plasticity and metalworking by pressure). Minsk, Izd-vo Nauka i tekhnika, 1964, 249-256

TOPIC TAGS: epitaxial growth, metal film, alkali halide, twinning, lattice parametery, trilling, epitaxy temperature, sprayed iron, sprayed aluminum

ABSTRACT: After discussing various theories that have been put forth concerning epitaxy, the authors give their opinions on the mechanism of condensation and oriented growth of vacuum-sprayed films. The discussion is simplified by examining the process of the formation and growth of the crystal seed on an ideal model consisting of one atomic row of an ionic crystal with lattice parameter a, on which a metal having a smaller lattice parameter is deposited. The deposited atom is polarized near the surface and, having given up part of the energy to the lattice, enters a potential well, under which is a halogen ion. As a result of migra-

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tion there are two deposited atoms in adjacent minima. They interact and, having lost part of their energy, form a twin. The interaction of the atoms of the twins and with the ions of the base layer results in the latter stretching the twin so that its atoms are under the halogen ions. In turn, the twin will compress the ions of the base layer, trying to bring them close to the lattice parameter of the deposited metal. As a result, the space between the atoms of twin b_1 will be greater that b, and the ions of the halogen will draw nearer so that the distance between them (a_1) will be less than a. As a result of this interaction the atoms of the twin will complete an oscillatory movement, not on the bottom of the potential well but on its walls. Two more atoms of the deposited metal enter into potential wells adjacent to the twin and interact with it. In order that they can be united with the twin the next halogen ion must be displaced, and by a greater magnitude than the first, since the atoms of the twin are on the wall of the next potential well farther from them. All this leads to the atoms joined to the crystal seed being further and further removed from the surface of the base layer by ascending up the wall of the potential well and the halogen ions being displaced a smaller distance. It was found that almost all metals when, sprayed on a single-crystal base layer of alkali halides heated to room temperature, form fine-

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ACCESSION NR: AT5006715

grained polycrystalline films. Heating of the base layer to 300-400C resulted in most of the grains of the sprayed film being oriented along the base layer, i.e., the plane of orientation coincided with its surface and the direction coincided with one of its crystallographic directions. At certain temperatures for various metals on a heated base layer the oriented single-crystal film of deposited metal grows completely. This temperature is called the temperature of epitaxy. This picture was observed when Fe and Al were sprayed on single-crystal base layers of NaCl, KCl, and KBr. It was established that the temperature of epitaxy for Fe sprayed on NaCl was 480C, on KCl 460C, and on KBr 440C; for Al, it was 450C on NaCl and 430C on KCl. Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 16May64 ENCL: 00 SUB CODE: IC ,SS

NO REF SOV: 002 OTHER: 006

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L 39978-65 EEC(b)-2/EWP(k)/EWA(c)/EWT(l)/EWT(m)/EWP(b)/T/EWA(d)/EWP(e)/EWP(t)
PT-4/Pi-4 IJP(c) GG/JD/HW/GS

ACCESSION NR: AT5006716 S/0000/64/000/000/0257/0260

AUTHOR: Severdenko, V. P. (Meritorious scientist of science and technology BSSR, Academician AN BSSR, Doctor of technical sciences, Professor); Tochitskiy, E. I.; Litvinko, A. G.; Vashchenko, N. D.

TITLE: Mechanism of growth of NaCl whiskers

SOURCE: AN BSSR. Fiziko-tekhnicheskiy institut. Plastichnost' i obrabotka metallov davleniyem (Plasticity and metalworking by pressure). Minsk, Izd-vo Nauka i tekhnika, 1964, 257-260

TOPIC TAGS: filamentary crystal, whisker growth, sodium chloride whisker, whisker strength

ABSTRACT: Filamentary crystals, or whiskers, of NaCl were grown by two methods: in a saturated solution of NaCl with the addition of polyvinyl alcohol and through a porous partition. In the first method 1% polyvinyl alcohol (by weight) was added to a saturated solution of NaCl, after which it was heated to the boiling point, then slowly cooled and filtered. A seed was lowered into the flask with the prepared solution and the NaCl whiskers began to grow on it. The linear rate of growth of the NaCl whisker was controlled by the rate of evaporation of the solution, pressure of the water vapor, and the surface area of evaporation. The

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ACCESSION NR: AT5006716

experiments showed that even a negligible temperature fluctuation (from 10 to 27C) led to a change in the growth rate of the whiskers. With slow evaporation the growth rate reached 1 cm per day. Their cross section was square with sides from several to 100 μ with a side ratio of 6 : 1. In the second method, with crystallization through a porous partition, whiskers did not grow in the initial period. In subsequent periods they grew at a rate appreciably less than that of the whiskers from the solution with polyvinyl alcohol. Growth of the whiskers through the porous partition took place as follows. An unsaturated solution of NaCl rose along capillary pores to the outside surface of the porous partition. Owing to evaporation this solution became supersaturated and crystallization seeds formed that were commensurate with the size of the capillary pores. Since the NaCl crystal that was formed filled the diameter of the capillary, it was pushed out by hydrodynamic forces; the unsaturated solution was again supersaturated; the NaCl was deposited on the root of the already formed crystal, and the solid phase was again pushed out. This growth continued until the weight of the crystal reached a certain magnitude above which the whisker could not adhere to the root in the capillary and dropped of its own weight. The length of the whiskers thus

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ACCESSION NR: AT5006716 O

grown reached 1.5-2.0 cm and their thickness varied from 5 to 100 μ. Mechanical tests showed that there is a so-called scale factor of the dependence of strength on the cross section of the whisker. The best quality NaCl whiskers had an elastic limit of about 1.4% and tensile strength of about 63 kg/mm^2, which is about 1000 times greater than for the usual NaCl crystals. Orig. art. has: 3 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 16May64 ENCL: 00 SUB CODE: IC , SS

NO REF SOV: 003 OTHER: 000

Card 3/3 MB

VELIDENKO, V.I.; ZHECHNIKOV, Ye.B.; SHELAMOV, V.A.

Rolling sintered aluminum powder (SAP) strip directly from powder. Tsvet. met. 37 no.11:88-90 '64. (MIRA 18:4)

SEVERENKO, V.P., akademik; TUMILOVICH, E.L.; YELIN, V.I.

Origination and development of cranks. Dokl. AN SSSR 158 no.6,1318-1319 O '64. (MIRA 17:12)

1. Fiziko-tekhnicheskiy institut AN BSSR. 2. AN BSSR (for Severenko).

SAVERCHENKO, V.P.; TEMLO, A.P.

Temperature of an operating stamp surface in drop forging. Dokl. AN BSSR 9 no.1:31-33 Ja '65. (MIRA 18:10)

1. Fiziko-tekhnicheskiy institut AN BSSR.

L 31103-65 EWT(m)/EWA(d)/EPR/EWP(t)/EWP(k)/EWP(b)/EWP(l)/EWA(h) Pf-4/Ps-4/
Peb IJP(c) JD/HW

ACCESSION NR: AP5003497 S/0148/65/000/001/0061/0064

AUTHOR: Severdenko, V.P.; Klubovich, V.V.

TITLE: Vertical distribution of the deformation in a sample during upsetting in an ultrasonic field

SOURCE: IVUZ. Chernaya metallurgiya, no. 1, 1965, 61-64

TOPIC TAGS: metal upsetting, ultrasonic action, ultrasonic upsetting, metal deformation, ultrasound, copper upsetting, aluminum upsetting

ABSTRACT: The purpose of this work was to determine whether the vertical distribution of the deformation in a metal sample after upsetting with a "Shoper" 2.5-ton machine in an ultrasonic field of 23 kcps follows the same pattern as after upsetting in the absence of such a field. To amplify the sound wave amplitude a waveguide consisting of 2 quarter-wavelength cylinders of different diameters was used. The sample was deformed between the buts of the machine and the waveguide. The same installation could be used for the ultrasonic and control tests. The samples consisted of copper and aluminum cylinders (diam. 6-8 mm, height 9-12 mm) bored through and threaded (thread M2.5 and M3) in such a way that the axis of the sample coincided with the thread bottom on one side. Then matching screws of the same material were screwed into the threaded borings, the

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L 31103-65

ACCESSION NR: AP5003497

2

samples were deformed and the thread pitch measured for deformation through a microscope. It was found that the distribution of deformation over the height of the sample was not uniform: when no ultrasonic field was applied, the greatest deformation was concentrated in the middle of the sample and it declined at both ends. Exactly the opposite was true for the deformation in an ultrasonic field. Orig. art. has: 3 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physics and engineering institute, AN BSSR)

SUBMITTED: 09Jul63 ENCL: 00 SUB CODE: MM

NO REF SOV: 001 OTHER: 000

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L 48101-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWP(z)/EWP(b)/EWP(l)/EWA(h) Pf-4/Pab MJW/JD/EM

ACCESSION NR: AP5009105 S/0250/65/009/002/0091/0093

AUTHOR: Konovalov, Ye. G.; Dovgyallo, I. G.; Remizovskiy, E. I.; Severdenko, V. P.

TITLE: Effect of high-frequency vibrations on static twisting of certain metals and alloys

SOURCE: AN BSSR. Doklady, v. 9, no. 2, 1965, 91-93

TOPIC TAGS: static load test, ultrasonic vibration, metal mechanical property, alloy/ D16T alloy

ABSTRACT: The effect of ultrasonic vibrations on static twisting of D16T alloy and commercial iron was studied. The tests were done on a modernized K-50 machine, both under a single static load and under a multiple load. The vibrations were produced by a UZG-2.5 ultrasonic generator with a PMS-7M magnetostriction transformer. The D16T alloy was tested in the annealed state (annealing for 5 hr at 370°C); the commercial iron (0.06% C) was vacuum-annealed at 1205°K for 0.5 hr, then furnace-cooled at 375°K/hr down to 675°K. The results show that an ultrasonic field during static twisting of D16T alloy and commercial iron causes a simultaneous

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L 48101-65
ACCESSION NR: AP5009105

reduction in all strength and ductility characteristics. The drop in mechanical characteristics is directly proportional to the amplitude of the ultrasonic vibrations. The character of the failure of the specimens subjected to static twisting differs markedly from that of specimens under a multiple load. In the latter case, the failure resembles the brittle fracture. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physicotechnical Institute AN BSSR)

SUBMITTED: 15Feb64 ENCL: 00 SUB CODE: MM

NO REF SOV: 006 OTHER: 002

Card 2/2

SEVERDENKO, V.P.; MAKOSHOK, Ye.M.; SEGAL, V.M.

Flow from a plane stamp into a slot. Dokl. AN BSSR 9 no.6:372-375 Je '65. (MIRA 18:9)

1. Fiziko-tekhnicheskiy institut AN BSSR.

L 10630-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(k)/EWP(b)/EWA(h)/EWA(c) IJP(c) JD
ACC NR: AR5023531 SOURCE CODE:UR/0275/65/000/008/V016/V016

SOURCE: Ref. zh. Elektronika i yeye primeneniye, Abs. 8V125

AUTHOR: Severdenko, V. P.; Klubovich, V. V.

TITLE: Effect of ultrasonics on the process of extension of copper

CITED SOURCE: Sb. Primeneniye ul'trazvuka v mashinostr. Minsk, Nauka i tekhnika, 1964, 3-6

TOPIC TAGS: ultrasonics, copper, metal stress, ultrasonic effect, solid mechanical property, tensile strength, metal test

TRANSLATION: The effect of 23-kc ultrasonic oscillations on the extension of annealed commercial copper, at room temperature, was investigated. It was found that the static force required for extending a 4-mm diameter rod decreases under ultrasonic conditions; with ultrasonic oscillations of 8 and 20 micron amplitude, the force is 75% and 30% of the initial, respectively. In addition, it was found that the ultrasonic action on a specimen under zero static load, for 2--3 min (with a 20 micron amplitude), tends to increase the copper ultimate strength; amplitude of 3--5 microns did not improve the copper. The results are explained by the activation of fixed dislocations. Bib 3, figs 2.

SUB CODE: 13, 20, 11

Card 1/1 UDC: 534.23-8

SEVERDENKO, V.P.; TOMILO, A.P.

Heat-insulating effect of lubricants in forging. Dokl. AN BSSR 9 no.3:167-168 Mr '65. (MIRA 18:6)

1. Fiziko-tekhnicheskiy institut AN BSSR.

SEVERONENKO, V.[illegible]; MARKOVICH, Ye.M.; SEGAL, V.M.

[illegible]sation of equations of a field of ally lines. Dokl. AN BSSR 9 no.7:454-457 Jl '65. (MIRA 18:9)

1. Fiziko-tekhnicheskiy institut AN Belorusskoy SSR.

SEVERDENKO, V.P.; UZILEVSKAYA, A.A.

Effect of a fall in temperature on the type of steel fracture.
Dokl. AN BSSR 9 no.8:526-528 Ag '65. (MIRA 18:10)

1. Fiziko-tekhnicheskiy institut AN BSSR.

SEVERIENKO, V.P.; KLUBOVICH, V.V.

Studying the extension of copper in an ultrasonic field at low temperatures. TSvet. met. 38 no.11:111-113 N '65. (MIRA 18:11)

SEVERDENKO, V.P.; TOMILO, A.P.

Heat exchange at the boundary between a forging and the die. Dokl. AN BSSR 9 no. 4:228-230 Ap '65 (MIRA 19:1)

1. Fiziko-tekhnicheskiy institut AN BSSR. Submitted February 4, 1965.

SEVERDENKO, V.P.; LEUS, I.S.

Study of specific parameters of the focus of deformation in rolling of copper at different temperatures. Dokl. AN BSSR 9 no. 5:310-311 My '65 (MIRA 19:1)

1. Fiziko-tekhnicheskiy institut AN BSSR i Belorusskiy politekhnicheskiy institut. Submitted December 14, 1964.

L 3654-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) IJP(c)
ACCESSION NR: AP5024149 MJW/JD/JG UR/0250/65/009/009/0591/0595

AUTHOR: Severdenko, V. P.; Uzilevskaya, A. A.

TITLE: Investigation of the properties of types 20 and 20Kh steels at low temperatures

SOURCE: AN BSSR. Doklady, v. 9, no. 9, 1965, 591-595

TOPIC TAGS: alloy steel, low temperature effect, tensile strength, yield stress, elongation/20 steel, 20Kh steel

ABSTRACT: Statistical tests were made on specially prepared samples at temperatures of 20, 0, -20, -40, -70, -100, -160, and -190C, in as delivered, annealed, and normalized states. The following strength and plastic properties of the two steels were tested at the above temperatures: yield point ($sigma_S$), tensile strength ($sigma_B$), the relative elongation (delta), and relative contraction (psi). The results are exhibited in graphic and tabular form. The following conclusions are drawn as to the behavior of types 20 and 20Kh steels under low temperature conditions. Lowering of the temperature leads to a rise in the strength properties ($sigma_B$ and $sigma_S$) and to a lowering of the plastic properties (delta and psi).

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L 3654-66

ACCESSION NR: AP5024149 //

Steel in the normalized state had the lowest sensitivity to a lowering of the temperature. The presence of 1% chromium has a favorable effect on the low temperature resistance of steels containing about 0.2% carbon. A comparison of the static and dynamic tensile strengths permits determination of the dynamic coefficient (K_d) whose value depends on the composition and structure of the steel: Steel 20Kh has a lower value of K_d than steel 20 and normalized steels have minimal values of K_d. The temperature dependence of the length of the yield surface and the magnitude of the local elongation are of identical form for the two steels. This can be explained on the basis of dislocation theory. For the steels tested, a noticeable amount of embrittlement sets in at a temperature of about -70C. Orig. art. has: 2 figures and 2 tables

ASSOCIATION: Fiziko-tekhnicheskiy institut AN BSSR (Physico-technical Institute of the AN BSSR); Belorusskiy politekhnicheskiy institut (Belorussian Polytechnic Institute)

SUBMITTED: 19Mar65 ENCL: 00 SUB CODE: MM

NR REF SOV: 006 OTHER: 001

Card 2/2

SEVERDENKO, V.P.; BARSEGYAN, M.A.

Investigating the effect of temperature on the coefficient of external friction during the rolling of L62 brass. Dokl. AN BSSR 9 no.10:671-674 O '65. (MIRA 18:12)

1. Belorusskiy politekhnicheskiy institut. Submitted June 12, 1965.

L 13648-66 EWP(e)/EWT(m)/T/EWP(t)/EWP(k)/EWP(b)/EWA(h)/EWA(c) JD/WW/HW/DJ/WH

ACC NR: AP6002392 SOURCE CODE: UR/0250/65/009/012/0817/0819

41 B

AUTHOR: Severdenko, V. P.; Labunov, V. A.

ORG: Belorussian Polytechnical Institute (Belorusskiy politekhnicheskiy institut)

TITLE: Effect of ultrasonic vibration on lubricant effectiveness in cold extrusion of metals

SOURCE: AN SSSR. Doklady, v. 9, no. 12, 1965, 817-819

TOPIC TAGS: ultrasonic vibration, metal extrusion, cold extrusion, extrusion lubricant, lubricant efficiency, efficiency improvement, ultrasound induced improvement

ABSTRACT: The effect of ultrasonic vibration on the effectiveness of lubricants used in cold extrusion of metals has been investigated. The UZG-10-M generator was used as the source of ultrasonic vibrations applied to lubricants. It was found that, on the average, ultrasound increases the effectiveness of all investigated lubricants 2—3 times. This beneficial effect of ultrasound is especially pronounced in lubricants containing surface-active substances such as oleic acid, wax, wax with additions of oleic acid, wax with additions of oleic acid and graphite, or wax with additions of zinc stearate and oleic acid. In these cases, the effectiveness of the lubricants was increased approximately 4—5 times. [ND]

SUB CODE: 11, 13 SUBM DATE: 10Aug65/ ATD PRESS: 4186

Card 1/1 HW

SEVERDENKO, V.P.; BARSEGYAN, M.A.

Effect of temperature on the external friction coefficient in the rolling of LS59-1 brass. Dokl. AN BSSR 9 no. 11:740-741 N '65 (MIRA 19:1)

1. Belorusskiy politekhnicheskiy institut.

L 28861-66 EWP(k)/EWT(m)/T/EWA(d)/EWP(t)/ETI IJP(c) DJ/JD/HW

ACC NR: AP6010497 SOURCE CODE: UR/0201/65/000/003/0093/0095

46
42
B

AUTHOR: Severdenko, V. P.; Muras, V. S.; Sukhodrev, E. Sh.

ORG: none

TITLE: Butt-free extrusion of tool steels A

SOURCE: AN BSSR. Vestsi. Seryya fizika-tekhnichnykh navuk, no. 3, 1965, 93-95

TOPIC TAGS: tool steel, metal extrusion, hot die forging, solid lubricant / 9KhS tool steel, R18 tool steel

ABSTRACT: Hot extrusion usually is accomplished in such a way that at the end of the process of deformation a part of the forging (the butt) always remains in the container and die under the punch (Fig. 1). In most cases the butt is a production waste which must be removed after the product is ejected from the die assembly. This restricts the possibilities for using such a highly effective forming method as hot extrusion, particularly as regards the fabrication of intricate shapes from expensive alloys and high-alloy steels. In this connection, the authors developed a method of butt-free hot extrusion of solid and hollow shapes from structural and high-alloy tool steels (9KhS, R18, etc.). The principle of this method is as follows: an intermediate link or "insert" (Fig. 2) is placed in between the punch and the forging; the height of the insert is not lower than that of the die. The material of this insert

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L 28861-66
ACC NR: AP6010497

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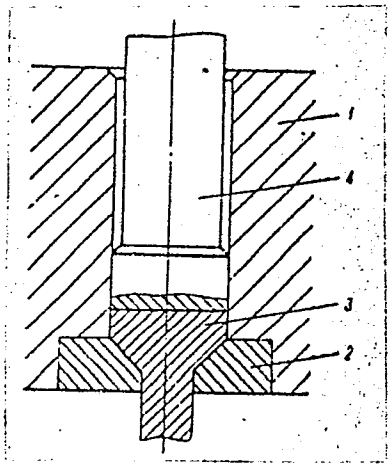

Fig. 1. Schematic of butt-involving extrusion:

1 - container; 2 - die; 3 - butt; 4 - punch

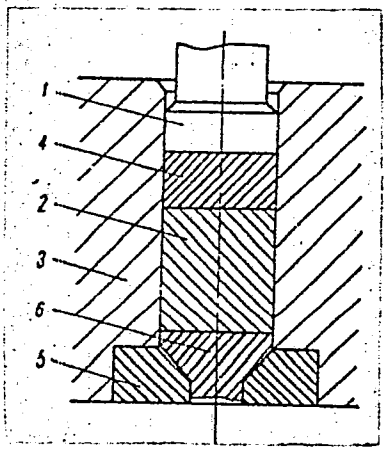

Fig. 2. Schematic of butt-free extrusion:

1 - punch; 2 - forging; 3 - container; 4, 6 - inserts; 5 - die

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must withstand considerable loads without a change in its properties, its strength should be lower than the strength of the extruded metal and it should display the qualities of a lubricant. So far, of the materials investigated for this purpose, the best results were displayed by a graphite-clay-silica mixture subjected to thermal or chemical hardening after its molding; remains of the carbon electrodes of electric arc furnaces also are suitable. This development not only assures a successful butt-free hot extrusion but also displays other positive aspects. Thus, early during the extrusion part of the "insert" flows into the gap between the punch and the container and, throughout the distance traveled by the punch, provides a uniform layer of lubricant which completely precludes jamming of the punch. Toward the end of the extrusion the material passes through the die and disintegrates into powder, which facilitates its removel for re-use. This technique also improves the conditions for automating the process of hot extrusion. Further, owing to the attendant improved lubricability of the die and product surfaces and shorter time of contact between the product and the die, galling is reduced and thus the wear of die also is reduced while the dimensional stability and surface quality of the extruded products are at the same time improved. With the aid of this technique the authors successfully hot-extruded solid and hollow reamers of 9KhS, R18 and 40Kh steels in crank presses. It turned out that this technique assures metal savings of 30-70%, reduces production cost, increases productivity, and markedly improves the quality of the tools (reamers, countersinks, screw taps) thus extruded. Orig. art. has: 2 figures.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 002

L 29690-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6008809 SOURCE CODE: UR/0136/65/000/011/0111/0113

AUTHORS: Severdenko, V. P.; Klubovich, V. V. 49 B

ORG: none

TITLE: A study of the stressing of copper in an ultrasonic field at low temperatures 27

SOURCE: Tsvetnyye metally, no. 11, 1965, 111-113

TOPIC TAGS: material strength, material testing, temperature effect, copper, ultrasonic field/ UZG-10M ultrasonic generator, PMS-7 transformer 26 10 26 10

ABSTRACT: Experimental work was performed to study the stress properties of copper in an ultrasonic field at room and lower temperatures. The work was conducted on a "Shoper" testing machine (2.5 tons) with a mechanical instrumentation system. Copper specimens annealed in vacuum at 650C were prepared to dimensions 6 mm diameter and 36 mm length. Ultrasonic generator UZG-10M was used as the vibration source, and a PMS-7 magnetostriction transformer was used to convert electrical impulses into mechanical vibrations. Additional descriptions of the experimental set-up refer to the manner of specimen fastening, stress concentration, and the methods of environmental control. Test temperatures were 0, -50, -110, and -196C. The technological means of instrumentation was, at least in part, patterned after the techniques of V. P. Severdenko and V. V. Klubovich (Dokl. AN BSSR, 1962, No. 9). Test results are plotted in Fig. 1.

Card 1/2 UDC: 669.3:539.5

L 29690-66

ACC NR: AP6008809

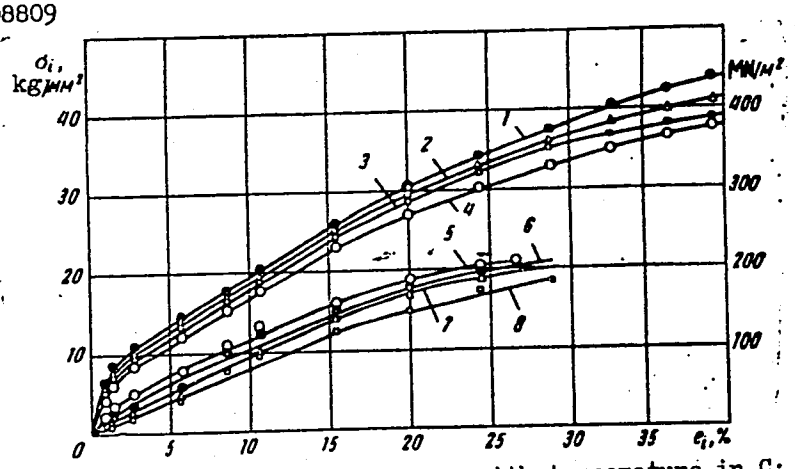

Fig. 1. Diagrams of actual stresses with temperature in C: 1,5 - (-196); 2,6 - (-110); 3,7 - (-50); 4,8 - (0); 1-4 - without ultrasonic vibrations; 5-8 - with ultrasonic vibrations.

Analysis of the measurements shows that decreasing temperature causes an increase in actual stress, however, the value of natural deformation does not vary. Ultrasonic vibrations caused a 45--50% decrease in the actual static stress and a 30% decrease of the natural strain. The stresses are related mathematically to the parameters of the standing wave formula. Orig. art. has: 3 equations, 1 table, and 1 figure.

Card 2/2 SUB CODE: 11,20/ SUBM DATE: none

SOURCE CODE: UR/0030/66/010/003/0388/0390

AUTHORS: Severdenko, V. P.; Remnikov, Yu. N.

ORG: Physico-Technical Institute of the AN BSSR (Fiziko-tekhnicheskiy institut AN BSSR)

TITLE: Heating of pipes during drawing in an ultrasonic field

SOURCE: AN BSSR. Doklady, v. 10, no. 6, 388-390

TOPIC TAGS: pipe, metal drawing, ultrasonic field, generator, magnetostrictor, steel alloy/ ShKh-15 steel alloy, PMS-6 magnetostrictor, UZG-10M ultrasonic generator

ABSTRACT: Heating of copper pipes during drawing in an ultrasonic field (to decrease drawing force required) was investigated on a universal pipe drawing machine (50-ton capacity). Ultrasonic energy was directed into the deformation region (ShKh-15 steel die, 12° cone) through a steel 45 concentrator from a PMS-6 magnetostrictor driven by a UZG-10M ultrasonic generator. Copper pipes (18.0 mm in diameter, 1.5 mm thick) were drawn with a drawing coefficient of $\mu \cong 1.7$ at 100--150 mm/min with and without the ultrasonic field, and the pipe temperature was monitored. It was found that the pipe temperature did not increase without the ultrasonic field and increased to 350--370K with the ultrasonic field. The lower yield strength at this temperature has a negligible effect on the drawing force decrease obtained with the ultrasonic field. Orig. art. has: 2 figures.

SUB CODE: 13/ SUBM DATE: 04Feb66/ ORIG REF: 006/ OTH REF: 002

L 46130-66 EWT(m)/EWP(t)/ETI/EWP(k) IJP(c) JD/WW SOURCE CODE: UR/0250/66/010/007/0465/0467

ACC NR: AP6026965

AUTHOR: Severdenko, V. P.; Klubovich, V. V.; Kharitonovich, M. V.

ORG: Physico-Technical Institute, AN BSSR (Fiziko-tekhnicheskiy institut AN BSSR)

TITLE: Distribution of second order residual stresses during the deformation of a metal in an ultrasonic field

SOURCE: AN BSSR. Doklady, v. 10, no. 7, 1966, 465-467

TOPIC TAGS: ultrasonic vibration, plastic deformation, x ray analysis, crystal lattice distortion

ABSTRACT: It has already been established that ultrasonic oscillations influence the plastic deformation of metals by facilitating slip processes, changing the nature of the distribution of deformation, etc. A study was undertaken to clarify the role of ultrasonic oscillations on the magnitude and distribution of residual microdeformation in crystal lattices and the second order residual stresses in samples after their deformation. Samples of Armco iron (8 mm in diameter and 12 mm long) were deformed to similar levels of strain, with and without an ultrasonic field of 19 Khz. The ultrasonic source was a PMS-15A-26 magnetostrictive convertor. After applying deformations of 5, 10, 15, 25 and 50% the samples were examined for residual stresses by x-ray methods. The residual lattice microstress ($\Delta a/a$) was determined from the formula

SUB [illegible] was: 1

REF: 002/ OTH REF: 002

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